

Date: Friday, 7/4/2008 12:50:10 PM  
 User: Kim Johnston

## Process Sheet

Customer : CU-DAR001 Dart Helicopters Services	Drawing Name : ARM	
Job Number : 40300		
Estimate Number : 12883		
P.O. Number :	Part Number : D3560043	
This Issue : 7/4/2008 S.O. No. :	Drawing Number : D3560 REV D	
Prsht Rev. : NC	Project Number : N/A	
First Issue : / / Type : MACHINED PARTS	Drawing Revision : D	
Previous Run : 35405	Material :	
Written By :	Due Date : 7/14/2008	Qty: Um: Each
Checked & Approved By : <u>080707</u>		
Comment : Est Rev: A New Issue 07.05.24 EC		
Est Rev B ECN 987 07.10.09 EC		
Est Rev: C ECN1048 07-12-18 DD verified by: EC		

## Additional Product

Job Number:



*was alone?*

Seq. #:	Machine Or Operation:	Description :
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1.0	M6061T6B0500X05000	6061-T6 Bar .50" x 5.0"
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Comment: Qty.: 1.3598 f(s)/Unit Total : 5.4390 f(s)  
 6061-T6 Bar 0.50" x 5.00"  
 Batch: M108586

2.0	BAND SAW	BAND SAW
-----	----------	----------



Comment: BAND SAW  
 Cut blanks 15.500" long

3.0	HAAS1	HAAS CNC VERTICAL MACHINING #1
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Comment: HAAS CNC VERTICAL MACHINING #1

1- Mill as per Folio FA695 Rev: B & Dwg D3560 Rev: D

2-C'sink 0.196" hole on manual mill as per dwg D3560

3-Deburr per dwg D3560

4.0	QC2	INSPECT PARTS AS THEY COME OFF MACHINE
-----	-----	--



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Friday, 7/4/2008 12:50:10 PM

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## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: ARM

Job Number: 40300

Part Number: D3560043

Job Number:



Seq. #:

Machine Or Operation:

Description:

5.0

QC8

SECOND CHECK



Comment: SECOND CHECK

8.5 08/07/22

6.0

D35921

Plate



Comment: Qty.: 1.0000 Each(s)/Unit Total: 4.0000 Each(s)

PLATE

B 35331-6

B 35921-24 B 341023=3

08.08.29

8.5

7.0

LARGE FAB 1

LARGE FABRICATION RESOURCE 1



Comment: LARGE FABRICATION RESOURCE 1

1-Weld assembly as per dwg D3560

## STEP:

- 1- clean material (buff bracket and bottom of arm with blue pad) SP
- 2- set up bracket and arm on jig SP
- 3- preheat bracket and arm with torch SP
- 4- clean before welding with brush SP
- 5- set up machine to 135 amps SP
- 6- weld across bottom and top ends SP
- 7- reheat with torch ( 65 deg C ) SP
- 8- on one side weld from bottom to top half way SP
- 9- same for other side (half way) SP
- 10- from half way point weld the rest of the first side (ease off pedal near end) SP
- 11- same for remaining side (ease off pedal near end) SP

S. H. P.

PB →

08.09.02

8.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

9.0

QC9

VISUAL WELDING INSPECTION



Comment: VISUAL WELDING INSPECTION

10.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



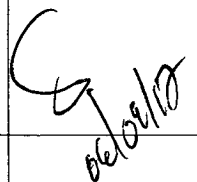


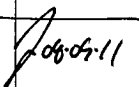



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D3560-043 PAR #: N/A Fault Category: Prod / Pwr. Lg. NCR: (Yes) No DQA: A Date: 08/09/15  
CAR 08-026 QA: N/C Closed: A Date: 08/09/15

NCR: 40300		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
8/1/13	# 70	Duckling welding inspection (4) parts found with a crack in the D3592-1 plate from welding	 08/09/15	All (4) (Qty x 1) Arms to be dropped and no replace as per Email from David Shepherd to Alan Stocke on 8/9/15 @ 1:36 pm	08/09/17 	 08/09/18	 08/09/15	 08/09/15
		R.C. Grain runs along the weld		See CAR 08-026	 08/09/11			 08/09/13

NOTE: Date & initial all entries

Date: Friday, 7/4/2008 12:50:10 PM

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## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: ARM

Job Number: 40300

Part Number: D3560043

Job Number:



Seq. #:

Machine Or Operation:

Description :

11.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

12.0

D2808

Bushing



Comment: Qty.: 1.0000 Each(s)/Unit Total : 4.0000 Each(s)  
Spacer  
batch: \_\_\_\_\_

13.0

SMALL FAB 1

SMALL & MEDIUM FAB RESOURCE 1



Comment: SMALL & MEDIUM FAB RESOURCE 1  
1-Press bushing in D3560 arm per dwg D3562

14.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

15.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1  
Identify and Stock  
Location: \_\_\_\_\_

16.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



W 08.09.18

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

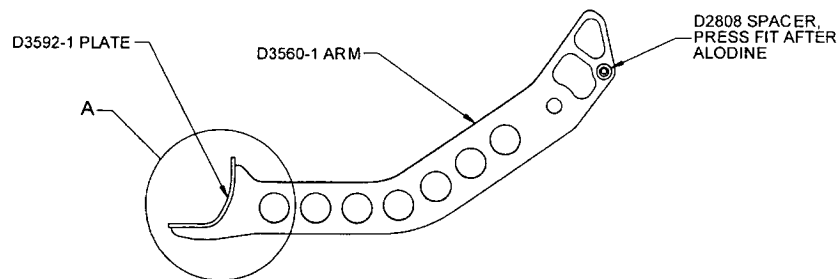
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

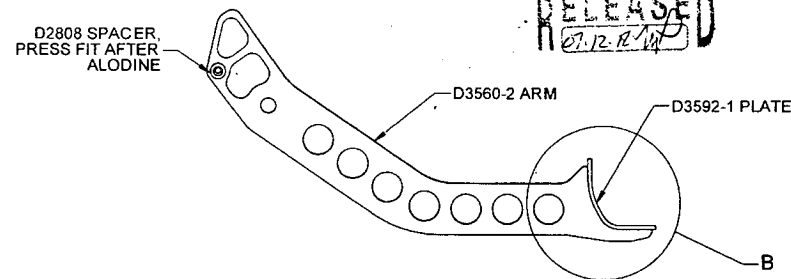
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

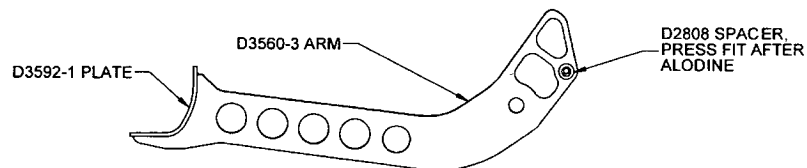
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07.12.14



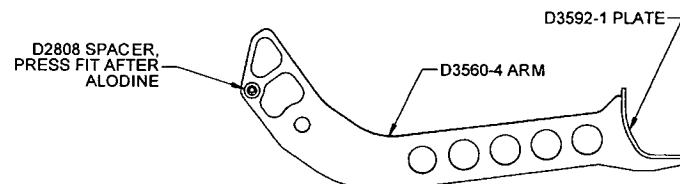
**D3560-041 ARM WELDMENT**



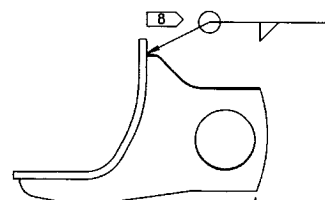
**D3560-042 ARM WELDMENT**



**D3560-043 ARM WELDMENT**



**D3560-044 ARM WELDMENT**



DETAIL A  
SCALE 1:2

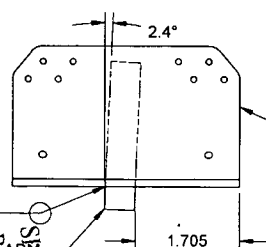
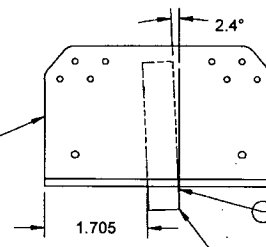
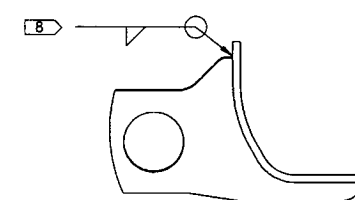


PLATE  
(REF)



ARM  
(REF)



DETAIL B  
SCALE 1:2

**PARTS LIST**

QTY -041	QTY -042	QTY -043	QTY -044	P/N	DESCRIPTION
X				D3560-041	ARM WELDMENT
	X			D3560-042	ARM WELDMENT
		X		D3560-043	ARM WELDMENT
			X	D3560-044	ARM WELDMENT
1	1	1	1	D2808	SPACER
1				D3560-1	ARM
	1			D3560-2	ARM
		1		D3560-3	ARM
			1	D3560-4	ARM
1	1	1	1	D3592-1	PLATE

- NOTES:**
- 1) MATERIAL: N/A
  - 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
  - 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
  - 4) UNITS: INCHES UNLESS OTHERWISE NOTED
  - 5) BREAK SHARP EDGES: 0.005 TO 0.015 MAX
  - 6) IDENTIFICATION: N/A
  - 7) WEIGHT: 1.23 lbs (TYP)
  - 8) WELDING: PER DART QSI 004

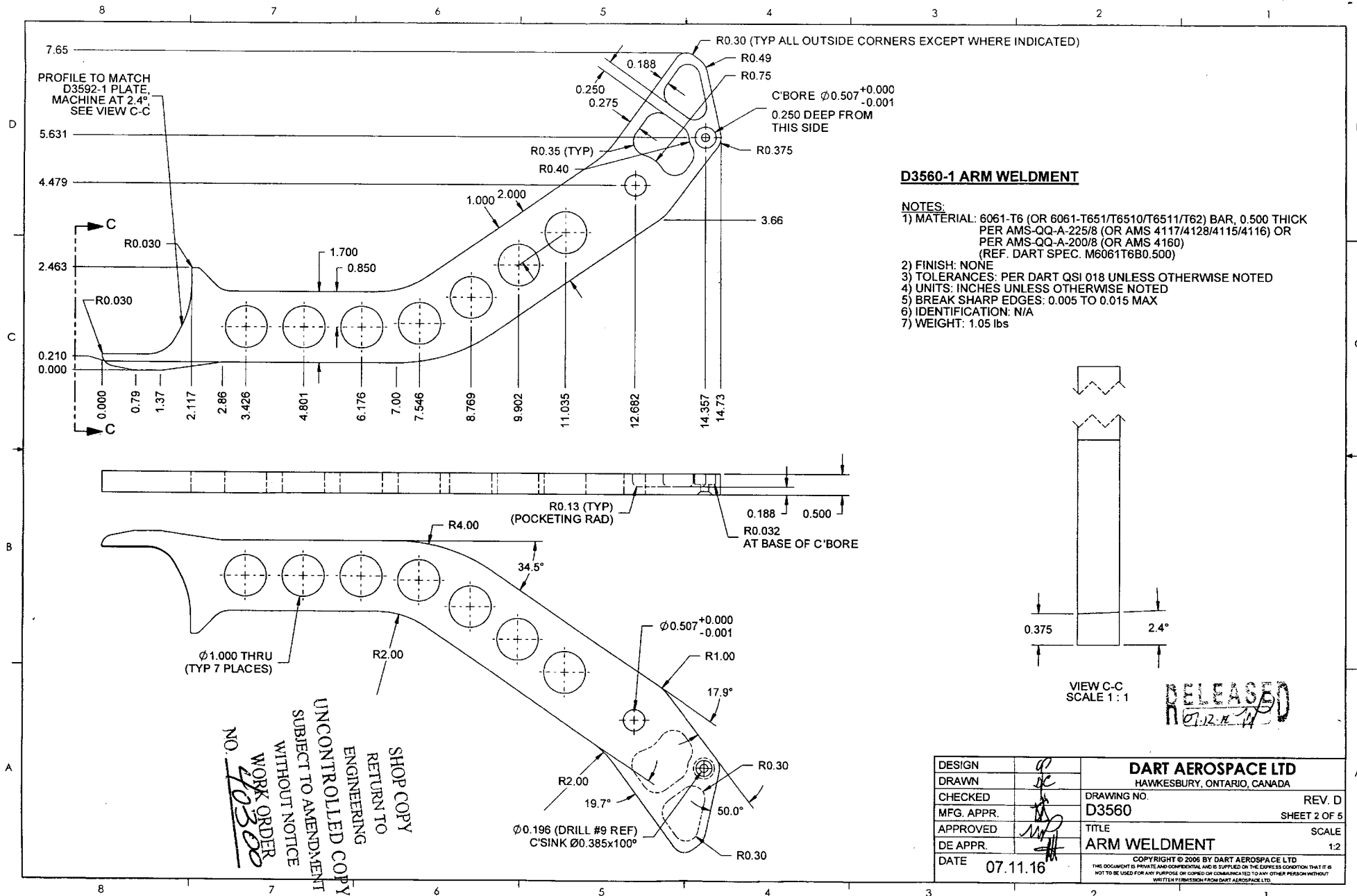
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 470800

D	ADD D2808 PRESS FIT NOTE; REDRAWN IN SOLIDWORKS	DC	07.11.16
C	REMOVE POWDER COAT	CP	07.06.19
B	REDESIGN AS WELDMENT, ADD POCKETS	CP	07.01.15
A	NEW ISSUE	CP	06.09.25
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	07.11.16		

**DART AEROSPACE LTD**  
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. **D3560** REV. D  
SHEET 1 OF 5  
TITLE **ARM WELDMENT** SCALE 1:4

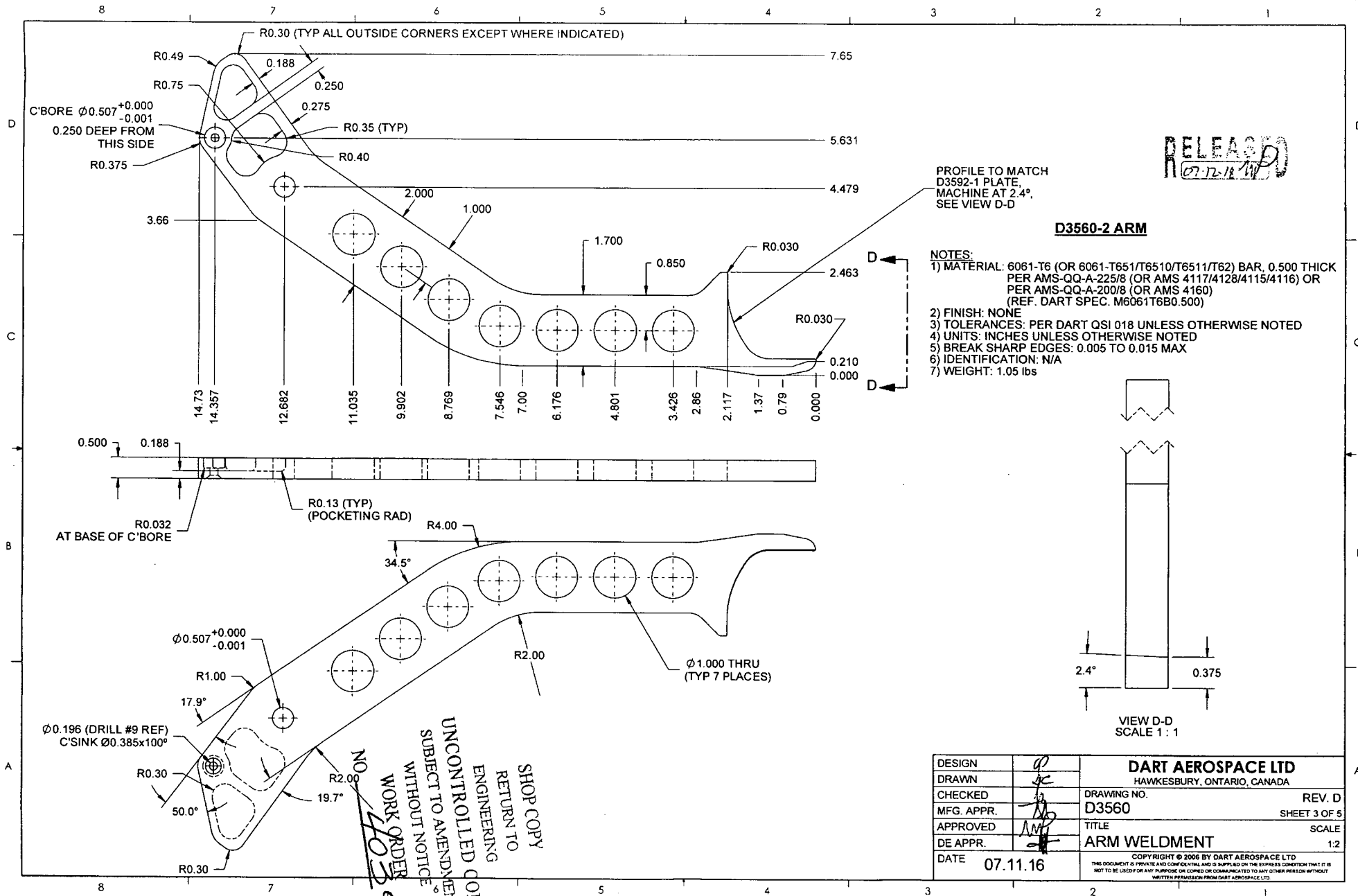
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# **D3560-1 ARM WELDMENT**

## **NOTES:**

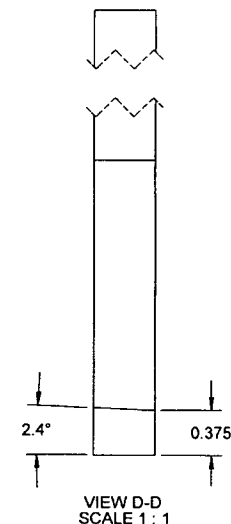
- 1) MATERIAL: 6061-T6 (OR 6061-T651/T6510/T6511/T62) BAR, 0.500 THICK  
PER AMS-QQ-A-225/8 (OR AMS 4117/4128/4115/4116) OR  
PER AMS-QQ-A-200/8 (OR AMS 4160)  
(REF. DART SPEC. M6061T6B0.500)
- 2) FINISH: NONE
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.015 MAX
- 6) IDENTIFICATION: N/A
- 7) WEIGHT: 1.05 lbs



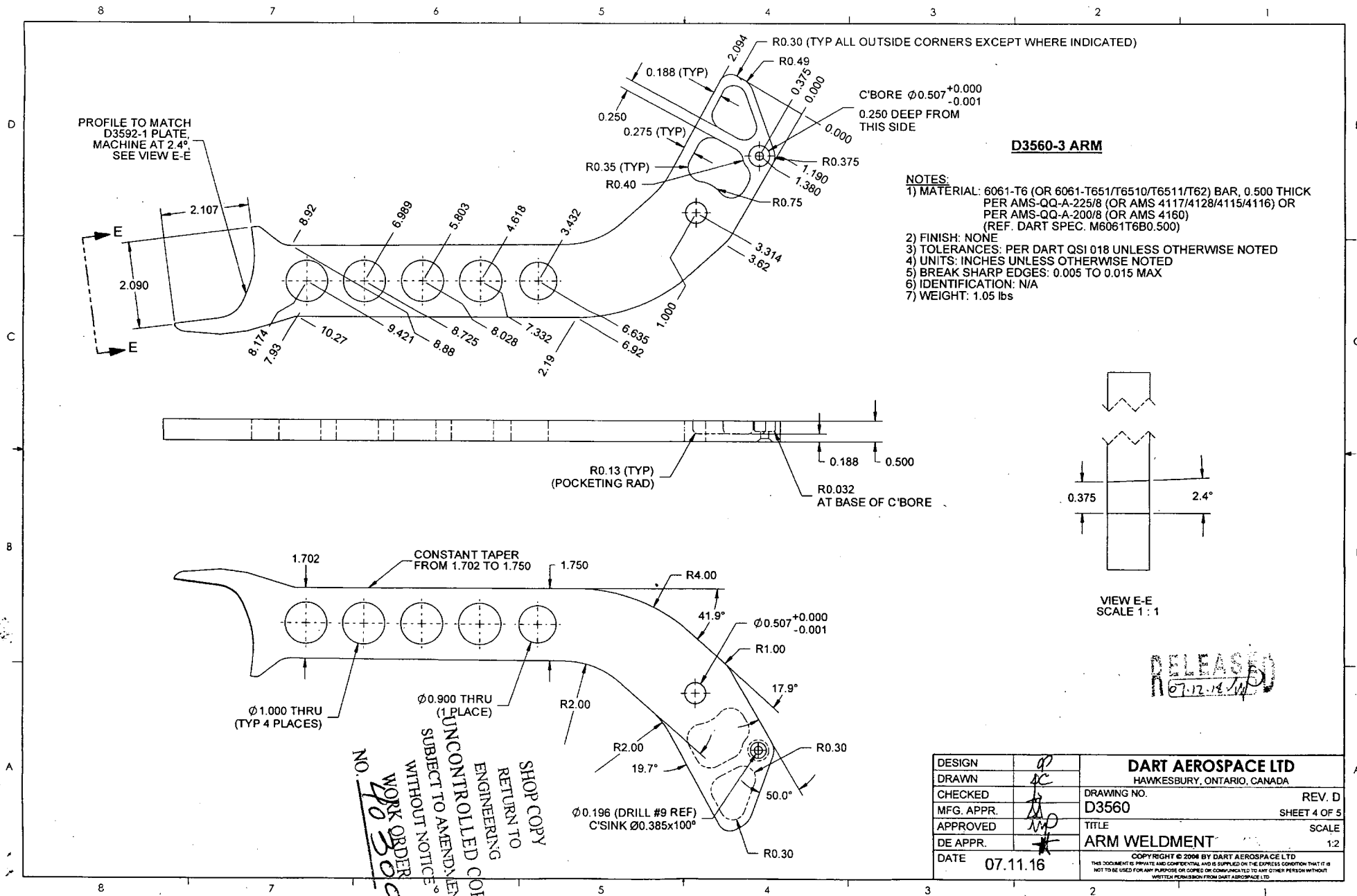
RELEASED  
 07-12-11

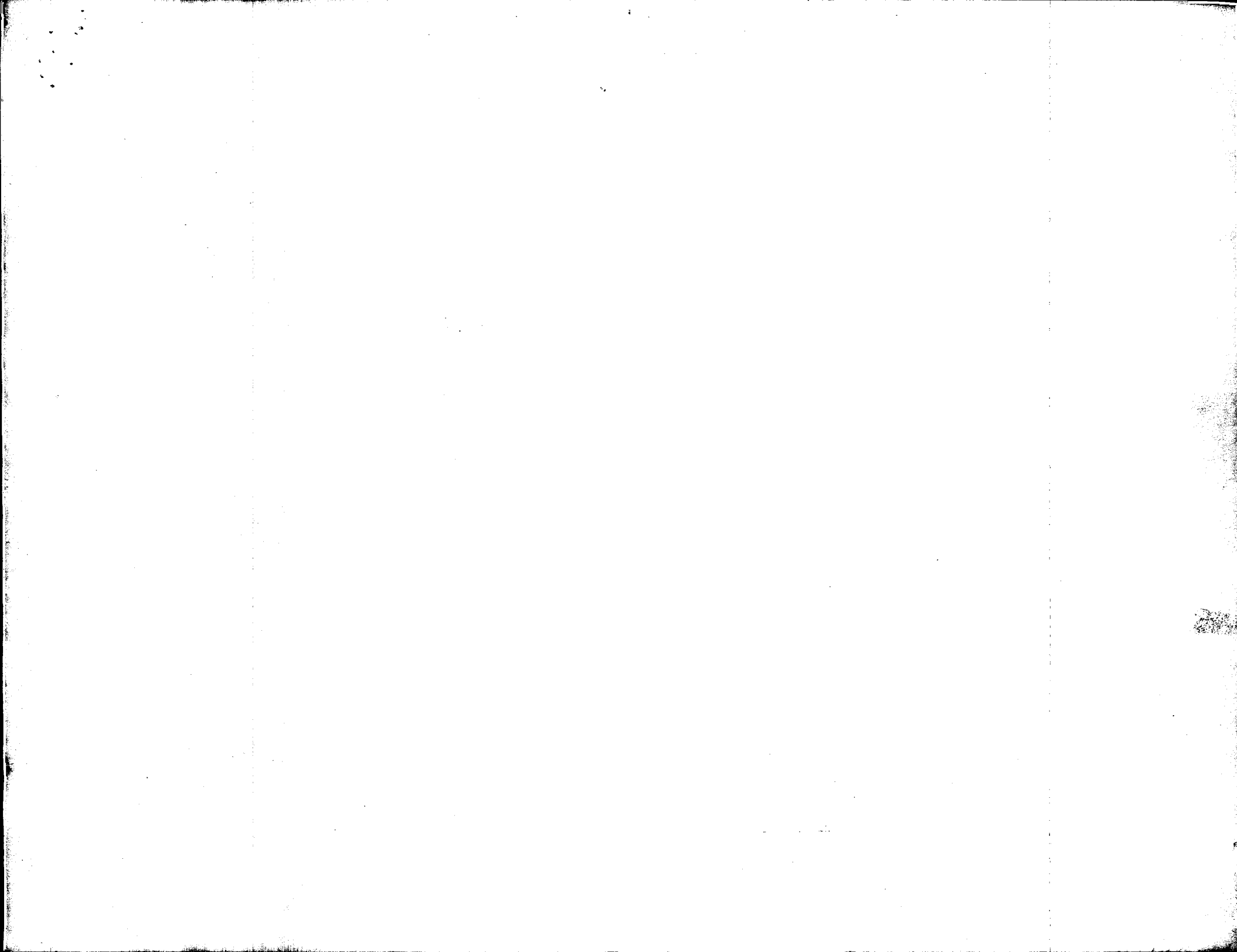
**D3560-2 ARM**

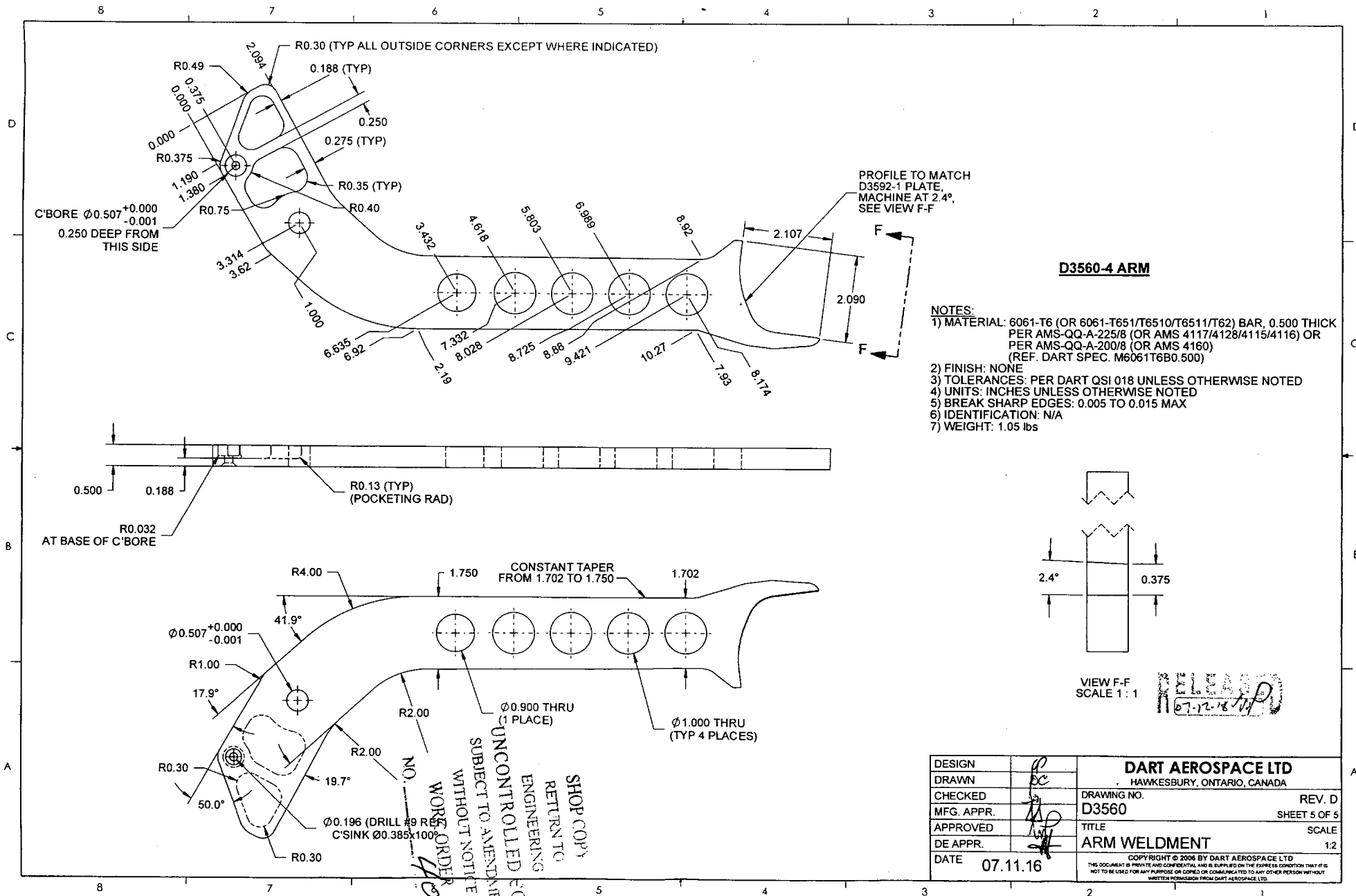
- NOTES:  
 1) MATERIAL: 6061-T6 (OR 6061-T651/T6510/T6511/T62) BAR, 0.500 THICK  
 PER AMS-QQ-A-225/8 (OR AMS 4117/4128/4115/4116) OR  
 PER AMS-QQ-A-200/8 (OR AMS 4160)  
 (REF. DART SPEC. M6061T6B0.500)  
 2) FINISH: NONE  
 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED  
 4) UNITS: INCHES UNLESS OTHERWISE NOTED  
 5) BREAK SHARP EDGES: 0.005 TO 0.015 MAX  
 6) IDENTIFICATION: N/A  
 7) WEIGHT: 1.05 lbs



DESIGN	q	<b>DART AEROSPACE LTD</b>	
DRAWN	4	HAWKESBURY, ONTARIO, CANADA	
CHECKED	g	DRAWING NO.	REV. D
MFG. APPR.	g	D3560	SHEET 3 OF 5
APPROVED	g	TITLE	SCALE
DE APPR.	g	ARM WELDMENT	1:2
DATE	07.11.16	COPYRIGHT © 2006 BY DART AEROSPACE LTD	
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**From:** David Shepherd [mailto:dshepherd@dartaero.com]  
**Sent:** September 10, 2008 1:36 PM  
**To:** 'Alan Stocker'  
**Cc:** 'Chris Provencal'; 'Mike Petsche'; 'Bill Beckett'; 'Susanne Sheldon'  
**Subject:** RE: D3560-044 & -042 Cracking

Alan,

Thanks for the pictures.

I am not comfortable with any sort of repair to these parts.

I think that all 14 parts should be scrapped.

And, at the risk of stating the obvious, we need to revisit the manufacturing process of this joint.

My preference, as it was a couple of years ago, is to eliminate this weld.

However, the geometry in that area is a little tricky.

Suggest we generate an NCR or PAR or whatever.

David

---

**From:** Alan Stocker [mailto:astocker@dartaero.com]  
**Sent:** Wednesday, September 10, 2008 10:26 AM  
**To:** 'David Shepherd'  
**Cc:** 'Chris Provencal'; 'Mike Petsche'  
**Subject:** D3560-044 & -042 Cracking

Good morning,

We have 13x D3560-044 and 1x D3560-042 that have cracks all but 1 in the same location. Attached image D3560-044 Crack 1 shows where 13 of the 14 cracks occurred. D3560-044 Crack 2 shows where the other crack occurred. The cracks shown in D3560-044 Crack 1 vary in depth from roughly 3/32 to 1/2 inch. I discussed this with Chris and Peter the consensus opinion is the parts are scrap. Further discussion with Chris indicates that changing grain direction to 45 degree on the sheet metal part may lower the scrap rate but not eliminate it. This has been done on a previous deviation with a less scrap. D3560-044 Crack 2 appears to just be an anomaly.

Please disposition all 14 parts.

Regards,

Alan Stocker  
Mechanical Designer

Dart Aerospace Ltd.  
1270 Aberdeen Street  
Hawkesbury, Ontario  
CANADA K6A 1K7

Phone: 613 632 5200 x 241  
FAX : 1 613 632 5246

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